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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/846,707

04/30/2001

Witold Kula

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7590

10/20/2004

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EXAMINER

MILLER, BRIAN E

ART UNIT

PAPER NUMBER

2652

DATE MAILED: 10/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/846,707

Applicant(s)

KULA ET AL.

Examiner

Brian E. Miller

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19 and 20 is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-8, 10-14, 17-18, 21 is/are rejected.
- 7) ☒ Claim(s) 4, 9, 15 and 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Claims 1-21 are pending.

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the upper layer “includes both NiFe and CoFe”, as recited in claims 9, 16, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled “Replacement Sheet” in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 5-8, 11, 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Mao et al (US 6,490,140). (As per claim 1) Mao et al discloses a GMR spin valve sensor for use in a magnetic disk drive device (col 1, lines 21-22), as shown primarily in FIG. 3 or 5, including: a pinned layer (66) 126 having a pinned layer magnetization; a free layer (70) 130 disposed adjacent the pinned layer, the free layer having a free layer magnetization perpendicular to the pinned layer magnetization in the absence of an external field; a spacer layer (68) 128 disposed between the free layer and the pinned layer; a pinning layer (64) 124 disposed adjacent the pinned layer for fixing the pinned layer magnetization; an underlayer (72) 138 disposed adjacent the pinning layer, the underlayer comprising NiFeCr (re claim 5); an upper layer (74) 142 disposed adjacent the underlayer and the pinning layer, the upper layer comprising a material selected from the group consisting of NiFe and CoFe (e.g. NiFe) for increasing a GMR ratio associated with the SV sensor; (re claim 2) wherein the upper layer has a thickness of between 4-20 Angstroms (see col. 10, lines 2-5); (re claim 7) the underlayer includes a Cr atomic % of 40 +/- 5 (col. 8, lines 1-3); (re claim 8) the pinned layer comprises a Ru layer 144 and CoFe layers 146, 142 disposed on either side thereof; (re claim 10) the free layer comprises a NiFe layer 150

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and CoFe layers 152, 148 disposed on either side thereof, (re claim 11) wherein the upper layer is considered to be non-magnetic because of its inherent composition.

(As per claims 1 & 21) With respect to the limitation, i.e., "wherein the sensor provides an increase... of at least 5% when compared to an otherwise identical sensor not having the upper layer", Mao et al is considered to encompass this limitation because the aforementioned upper layer and all the other claimed structure is disclosed, and would necessarily, at least inherently, produce the claimed results. For example, FIG. 3 shows a GMR ratio of about 13.0% (see graph FIG. 9-and col. 11, lines 17-20), while a "otherwise identical sensor not having the upper layer" as stated in applicant's "Background" or "Prior Art" has a net change of between 6-8% (see page 5, lines 17-20-and FIG. 1). This would show a net change of resistance of between 5-7%.

With respect to claim 21 and the recitation of an actuator which moves the SV sensor, it is inherent to the recitation of a magnetic disk drive in Mao et al (col, 1, lines 20-21) that an actuator would be present along with the respective controller, for proper operation of the disk drive.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

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evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 3, 17, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mao et al. For a description of Mao et al, see the rejection, supra. Mao et al only remains silent as to the upper layer 142 being formed of CoFe, in place of NiFe. As CoFe and NiFe are commonly known ferromagnetic materials, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have readily substituted CoFe for NiFe, or vice versa, for the upper layer material. The motivation would have been: lacking any unobvious or unexpected results, a skilled artisan would have readily realized that the two materials are equivalent and therefore substitutable for each other. Furthermore, it has been held that selecting a known material on the basis of its suitability for the intended use is a matter of obvious design choice; see *In re Leshin*, 125 USPQ 416 (CCPA 1960).

Furthermore (as per claims 3, 17, 18), with respect to the upper layer thickness being “less than 5A”, while Mao et al sets forth a preferred range for this layer to be “preferably in the range of *about* 5A to about 30A”(emphasis added by the Examiner), if not encompassing the claim limitation, at least it would have been obvious to have modified the thickness to do so, the resulting thickness being provided through routine engineering experimentation and optimization, in lieu of any unobvious or unexpected results and/or criticality.

Additionally, the law is replete with cases in which the mere difference between the claimed invention and the prior art is some range, variable or other dimensional limitation within the claims, patentability cannot be found.

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It furthermore has been held in such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range(s); see *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Moreover, the instant disclosure does not set forth evidence ascribing unexpected results due to the claimed dimensions; see *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338 (Fed. Cir. 1984), which held that the dimensional limitations failed to point out a feature which performed and operated any differently from the prior art.

7. Claims 10, 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mao et al in view of Huai et al (US 6,222,707). For a description of Mao et al, see the rejections, supra. Additionally (re claims 10, 12), with respect to the NiFeX underlayer, where “X is not Cr”, although Mao et al does not specifically recite another alternative material in place of Cr, from at least statements within the reference, e.g., col. 2, lines 21-24, col. 3, lines 64-67, col. 11, lines 39-42, it is considered that it would encompass one having ordinary skill in the art to provide an appropriate alternate to “Cr”. Huai et al is cited to disclose an appropriate spin valve MR which includes a seed layer made of NiFeX, wherein X is Cr in a preferred embodiment, however, is considered to encompass other materials as well, e.g., NiFeNb, NiFeRh. From these teachings, it would have been considered well within the skilled artisan to substitute other materials for X other than “Cr”, which would have had similar characteristics to Cr. The motivation would have been: lacking criticality and/or any unobvious or unexpected results, other appropriate materials would have resulted through routine engineering experimentation and optimization, as would have been realized by a skilled artisan.

Allowable Subject Matter

8. Claims 4, 9, 15-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Claims 19-20 are allowable over the prior art of record.

Response to Amendment

10. Applicant's arguments filed 6/21/04 have been fully considered but they are not persuasive.

A...Applicant asserts (page 8 of the "Remarks") that Mao only shows an increase of the net resistance change "by addition of the underlayer to similar structures of only 2.7%" and points to FIG. 8 (showing a 10.3% change) and FIG. 9 (showing a 13% change).

This is not considered persuasive for two reasons. Regardless of the showings of Mao et al, the structure as claimed is identical to that of Mao et al, so thus must inherently meet the claimed results. Applicant does not particularly set forth the structure, other than an upper layer, which Mao et al has, to otherwise produce the claimed results, i.e., 5% increase.

Secondly, the premise for applicant's argument appears to be misdirected. FIG. 2 and FIG. 3 (from which the data of FIG. 8 & FIG. 9 is taken) are not necessarily considered to be "an otherwise identical sensor." FIG. 2 is a configuration of a "top spin valve" while FIG. 3 shows a "bottom spin valve" structure. Direct correlation is thus difficult. FIG. 3 of Mao et al, however, is considered to be more similar to the structure shown in FIG. 1 of the instant disclosure, i.e., prior art, which structure only has a net change of 6-8% by applicant's admittance (see instant

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disclosure on page 5, lines 17-20). Thus, compared with Mao et al's 13.0% change, it would be well above the claimed 5%.

B... With respect to claims 3, 17, 18 applicant reasserts that "wherein the upper layer has a thickness less than 5A," does not read on Mao et al.

The Examiner maintains that the teaching of Mao, i.e., "about 5A to about 30A, and more preferably approximately 10A," would not constitute a *patentable* distinction over the claimed "less than 5A", as discussed above.

C... With respect to claims 10, 12-14, and the limitation of the underlayer being NiFeX with X being not Cr, applicant asserts that the combination of Mao in view of Huai would not render the claims obvious, because "Mao indicates that a layer of NiFeCr is critical to the functionality of Mao's structure.

While Mao does not give alternatives to having the NiFeCr seed layer structure, it can not be stated that other materials, having similar characteristics to NiFeCr, as taught by Huai, could not be substituted for NiFeCr. It is maintained that the teachings of Huai would allow a skilled artisan to *at least* experiment with such materials, thus rendering the claims obvious.

Furthermore, it has been held to be within the general knowledge of a skilled artisan to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice; see *In re Leshin*, 125 USPQ 416 (CCPA 1960) and *In re Aller*, 105 USPQ 233 (CCPA 1955), regarding these matters.

Furthermore, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the

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knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, while NiFeCr may be the “best” material for Mao’s invention, certainly, the teachings of Huai et al, having alternatives to NiFeCr, would have at least made it obvious to a skilled artisan to have experimented with the alternative materials in Mao.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

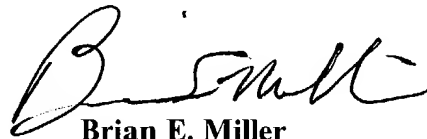
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian E. Miller whose telephone number is (703) 308-2850. The examiner can normally be reached on M-TH 7:15am-4:45pm (and every other friday).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'B. E. Miller', is positioned above the printed name.

Brian E. Miller
Primary Examiner
Art Unit 2652

BEM
October 18, 2004